

WHAT IS CLAIMED IS:

1. An optical head, comprising:

a first light source having a first wavelength and a first optical axis;

5 a second light source having a second wavelength different from the first wavelength and a second optical axis intersecting with the first optical axis;

a third light source having a third wavelength different from the first wavelength and the second wavelength and a third optical axis that is substantially parallel to the first optical axis; and

10 a beam splitter provided for allowing light beams from the first light source, the second light source and the third light source to pass through or reflecting these light beams, the beam splitter being surrounded with the first light source, the second light source and the third light source,

wherein the beam splitter comprises:

15 a first prism that is provided so that the light beam from the first light source enters therein;

a second prism that is provided so that the light beam from the second light source enters therein;

20 a third prism that is provided so that the light beam from the third light source enters therein;

a fourth prism that is provided between the first prism and the third prism so as to be opposed to the second prism;

a first optical film that is formed between the first prism and the second prism;

25 a second optical film that is formed between the second prism and the third prism;

a third optical film that is formed between the third prism and the fourth prism; and

30 a fourth optical film that is formed between the fourth prism and the first prism,

wherein the first to the fourth optical films have desired optical characteristics for allowing the light beam from the first light source that enters into the first prism and has the first wavelength, the light beam from the second light source that enters into the second prism and has the second wavelength and the light beam from the third light source that enters into the third prism and has the third wavelength to pass through or for
35 reflecting these light beams.

2. The optical head according to claim 1,
wherein the first to the fourth prisms have a substantially
triangular prism form, and

5 the beam splitter has substantially a hexahedral form that is formed
with a bottom face, a top face and one of the side faces of each of the first to
the fourth prisms.

3. The optical head according to claim 1,
10 wherein the first optical film and the third optical film are formed on
the same plane and have the same optical characteristics, and
the second optical film and the fourth optical film are formed on the
same plane and have the same optical characteristics.

15 4. The optical head according to claim 1,
wherein the first wavelength, the second wavelength and the third
wavelength respectively are three different wavelengths selected from four
types including 750 nm to 850 nm, 600 nm to 700 nm, 400 nm to 500 nm
and 300 nm to 400 nm.

20 5. The optical head according to claim 1,
wherein the first optical axis and the second optical axis intersect at
substantially right angles, and
the first optical axis and the third optical axis form an angle of
25 substantially 180 degrees.

6. The optical head according to claim 1, wherein a reflectance or a
transmittance of each of the first to the fourth optical films is changed in
accordance with a wavelength of an incident light beam.

30 7. The optical head according to claim 1,
wherein the first optical film and the third optical film have optical
characteristics such that a light beam having a wavelength not shorter than
a first threshold value is allowed to pass through and a light beam having a
35 wavelength shorter than the first threshold value is reflected therefrom, and
the second optical film and the fourth optical film have optical
characteristics such that a light beam having a wavelength not shorter than

a second threshold value that is higher than the first threshold value is reflected therefrom and a light beam having a wavelength shorter than the second threshold value is allowed to pass through.

5 8. The optical head according to claim 1, wherein a reflection film for reducing an amount of light at substantially a center portion of a light beam is formed on at least one of the first to the fourth prisms.

10 9. The optical head according to claim 8, wherein the reflection film has any one of a strip shape, a circular shape and an oval shape.

15 10. The optical head according to claim 1, wherein a light beam diameter restriction film that restricts a diameter of a light beam emitted from the beam splitter is formed on the beam splitter.

11. The optical head according to claim 1, wherein the first to the fourth prisms are made of at least one selected from the group consisting of glass, resin, and transparent ceramic.

20 12. The optical head according to claim 1, further comprising a collimator lens that is provided for converting the light beams emitted from the first to the third light sources into parallel beams,
 wherein the collimator lens is provided so as to be attached to the fourth prism.

25 13. The optical head according to claim 1, further comprising collimator lenses that are provided for converting the light beams emitted from the first to the third light sources into parallel beams,
 wherein the collimator lenses are disposed between the first light
30 source and the first prism, between the second light source and the second prism and between the third light source and the third prism.

14. The optical head according to claim 1,
 wherein each of the first to the third prisms has an incident surface
35 that is formed so as to cancel astigmatisms possessed by the light sources, and
 the fourth prism has an emission surface that is formed so as to

cancel the astigmatisms possessed by the light sources.

15. An optical head, comprising:

a first light source having a first wavelength and a first optical axis;

5 a second light source having a second wavelength different from the first wavelength and a second optical axis intersecting with the first optical axis;

a third light source having a third wavelength different from the first wavelength and the second wavelength and a third optical axis that is substantially parallel to the first optical axis; and

10 a beam splitter provided for allowing light beams from the first light source, the second light source and the third light source to pass through or reflecting these light beams, the beam splitter being surrounded with the first light source, the second light source and the third light source,

15 wherein the beam splitter comprises:

a first prism that is provided so that the light beam from the first light source enters therein;

a second prism that is provided so that the light beam from the second light source enters therein;

20 a third prism that is provided so that the light beam from the third light source enters therein;

a first optical film that is formed between the first prism and the second prism; and

25 a second optical film that is formed between the first prism and the third prism,

wherein the first optical film has first optical characteristics for allowing the light beam from the first light source that enters into the first prism and has the first wavelength and the light beam from the second light source that enters into the second prism and has the second wavelength to pass through or for reflecting these light beams, and

30 the second optical film has second optical characteristics, which are different from the first optical characteristics, for allowing the light beam from the first light source that enters into the first prism and has the first wavelength, the light beam from the second light source that enters into the second prism and has the second wavelength and the light beam from the third light source that enters into the third prism and has the third wavelength to pass through or for reflecting these light beams.